CPP

SETS & RELATIONS : SHEET - 3

Problems involving incusion-exclusion & Cartesian Product

LEVEL-1

1. If for three disjoint sets A, B, C; n(A) = 10, n(B) = 6 and n(C) = 5, then $n(A \cup B \cup C)$ is equal to -
(A) 21 (B) 11 (C) 1 (D) 9

2. If A and B are disjoint, then $n(A \cap B)$ is equal to-
(A) 0 (B) n(B) (C) n(A) + n(B) (D) n(A).n(B)

3. If X and Y are two sets, then $X \cap (Y \cup X)^c$ equals-
(A) X (B) Y (C) ϕ (D) none

4. Let n (U) = 700, n(A) = 200, n(B) = 300 and $n(A \cap B) = 100$, then $n(A^c \cap B^c)$ is -
(A) 400 (B) 600 (C) 300 (D) 200

5. The set $(A \cap B^c)^c \cup (B \cap C)$ is equal to -
(A) $A \cup B \cup C$ (B) $A^c \cup B$ (C) $A^c \cup B^c$ (D) none

6. Sets A and B have 3 and 6 elements respectively. What can be the minimum number of elements in $A \cup B$?
(A) 3 (B) 6 (C) 9 (D) 18

7. If $A = \{2, 3\}$ and $B = \{1, 2\}$, then $A \times B$ is equal to -
(A) $\{(2, 1), (2, 2), (3, 1), (3, 2)\}$ (B) $\{(1, 2), (1, 3), (2, 2), (2, 3)\}$
(C) $\{(2, 1), (3, 2)\}$ (D) $\{(1, 2), (2, 3)\}$

8. Let A = {a, b, c, d}, B = {b, c, d, e}. Then $n[(A \times B) \cap (B \times A)]$ is equal to -
(A) 3 (B) 6 (C) 9 (D) none

9. If A, B and C are any three sets, then $A \times (B \cup C)$ is -
(A) $(A \times B) \cup (A \times C)$ (B) $(A \cup B) \times (A \cup C)$
(C) $(A \times B) \cap (A \times C)$ (D) none of these

10. If A, B and C are any three sets, then $A \times (B \cap C)$ is -
(A) $(A \times B) \cup (A \times C)$ (B) $(A \times B) \cap (A \times C)$
(C) $(A \cup B) \times (A \cup C)$ (D) $(A \cap B) \times (A \cap C)$

LEVEL-2

1. If A and B are disjoint, then $n(A \cup B)$ is equal to-
(A) n(A) (B) n(B) (C) n(A) + n(B) (D) n(A).n(B)

2. In a class of 100 students, 55 students have passed in Mathematics and 67 students have passed in physics, no student fails. Then the number of students who have passed in Physics only is-
(A) 22 (B) 33 (C) 10 (D) 45

3. Among 1000 families of a city, 40% read newspaper A, 20% read newspaper B, 10% read newspaper C, 5% read both A and B, 3% read both B and C, 4% read A and C and 2% read all three newspapers. The number of families which read only newspaper A is -
(A) 140 (B) 290 (C) 330 (D) 340

4. If $n(A) = 10$, $n(B) = 15$ and $n(A \cup B) = x$, then -

(A) $15 < x < 25$ (B) $15 \le x \le 25$ (C) $5 \le x \le 15$ (D) None of these

5. In a survey of 600 students in a school, 150 students were found to be drinking Tea and 225 drinking Coffee, 100 were drinking both Tea and Coffee. Find how many students were drinking neither Tea nor Coffee.

6. There are 20 students in a Chemistry class and 30 students in a Physics class. Find the number of students which are either in Physics class or Chemistry class in the following cases:
   (i) two classes meet at the same hour
   (ii) the two classes meet at different hours and ten students are enrolled in both the courses.

7. Of the number of three athletic teams in a school, 21 are in the basketbal team, 26 in hockey team and 29 in the football team. 14 play hockey and basketball, 15 play hockey and football, 12 play football and basketball and 8 play all the games. How many members are there in all?

8. Each student in a class of 40, studies at least one of the subjects English, Mathematics and Economics. 16 Study English, 22 Economics and 26 Mathematics, 5 study English and Economics, 14 Mathematics and Economics and 2 English, Economics and Mathematics. Find the number of student who study:
   (i) English and Mathematics
   (ii) English, Mathematics but not Economics.

ANSWERS - SHEET - 3

LEVEL-1

1. A
2. A
3. C
4. C
5. B
6. B
7. A
8. C
9. A
10. B

LEVEL - 2

1. C
2. D
3. C
4. B
5. 325
6. (i) 50 (ii)40
7. 43
8. (i) 7 (ii) 5